FLOWER PIGMENTS

RECENT researches by Wheldale and Bassett[1] have shown that there are four flower pigments, *i. e.*, ivory, yellow, red and magenta, in *Antirrhinum majus,* and that these, in various combinations and in different states of concentration and dilution, are responsible for all the color varieties. The ivory and yellow pigments have been identified with apigenin and luteolin respectively, *i. e.*, members of the class of soluble yellow plant pigments containing carbon, hydrogen and oxygen; the red and magenta pigments are anthocyanins. The yellow, red and magenta pigments occur only in the epidermis of the corolla, but ivory is present in the inner tissues. The pigments are present in the plant as glucosides, that is combined with sugar. For preparation, the flowers are boiled with water, the pigments precipitated as insoluble lead salts from the filtered solution by adding lead acetate. The lead salts are filtered off and decomposed with dilute sulphuric acid which forms insoluble lead sulphate and sets free the pigment again in dilute acid solution. These solutions are then boiled for several hours, whereby the sugar is split off from the glucoside and the free pigment, which is less soluble, separates out and is filtered off. The anthocyanins are separated from the yellow (flavone) pigments by extracting the latter with ether in which the anthocyanins are insoluble. The red and magenta pigments have been purified and analyzed and shown to contain carbon, hydrogen and oxygen only but a higher percentage of oxygen than the flavones. Determination of the molecular weights of the anthocyanins also indicates that their molecules are larger than those of the flavone pigments. Hence if the anthocyanins are derived from the flavones, it seems likely that the process is one of oxidation accompanied by condensation of two or more flavone molecules or the union of flavone molecules with other allied compounds in the plant. It is possible that the factors for red and magenta color will come to be expressed in terms of chemical substances which condense with the flavones to from the larger molecules of the anthocyanins.

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[1] Wheldale, M., "The Flower Pigments of *Antirrhinum majus*. 1. Method of Preparation," *Biochem. Jour.,* 1913, 7, 87. Wheldale, M., and Bassett, H. Ll., "The Flower Pigments of *Antirrhinum majus*. 2. The Pale Yellow or Ivory Pigment," *Biochem. Jour.,* 1913, 7, 441; "The Chemical Interpretation of Some Mendelian Factors for Flower-color," *Proc. Roy. Soc.,* 1914, B, 87, 300; "The Flower Pigments of *Antirrhinum majus*. 3. The Red and Magenta Pigments," *Biochem. Jour.,* 1914, 8, 204.